

US EPA ARCHIVE DOCUMENT

Jim N

# **APPLICATION FOR PROJECT XL: LEACHATE RECIRCULATION AND BIOREACTOR SYSTEMS**

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**WASTE MANAGEMENT**

**King George County Landfill and Recycling Center  
Maplewood Recycling and Waste Disposal Facility**

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1 August 2000



**GeoSyntec  
Consultants**



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# Overview

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- ◆ Purpose of Project and Overview
- ◆ Permitting
- ◆ Description of Leachate Recirculation and Bioreactor System Programs
- ◆ Components of Final Project Agreement
  - Technical Scope of Work Performed
  - ~~Proposed~~ Outline of Proposed Monitoring Program
  - Legal Requirements of USEPA

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# What are Leachate Recirculation and Bioreactor Technologies About?

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- ◆ Well-established technologies; (California 1970's)  
(1960's extensive laboratory studies)
- ◆ First used in 1974; hundreds of successful applications since then;
- ◆ Currently being used at nearly one hundred landfills;
- ◆ WM is recirculating leachate at three landfills in Virginia: Charles City County, Middle Peninsula, and Atlantic Waste.

DE Solid Waste Authority since mid 1980's.

Germany, Switzerland and Austria

# Benefits of Bioreactor Landfills

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- ◆ Improved leachate quality;
- ◆ Decreased leachate management costs;
- ◆ Increased waste disposal capacity;
- ◆ Improved economics of energy recovery project feasibility;
- ◆ Earlier re-use of site;
- ◆ Reduced settlement and strain in final cover system;
- ◆ Decreased post-closure care maintenance requirements;
- ◆ Decreased potential for post-closure impacts to environment.

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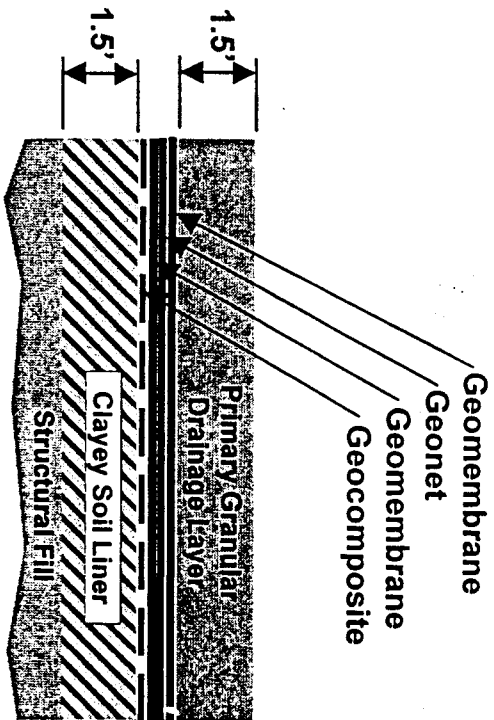
# Introduction

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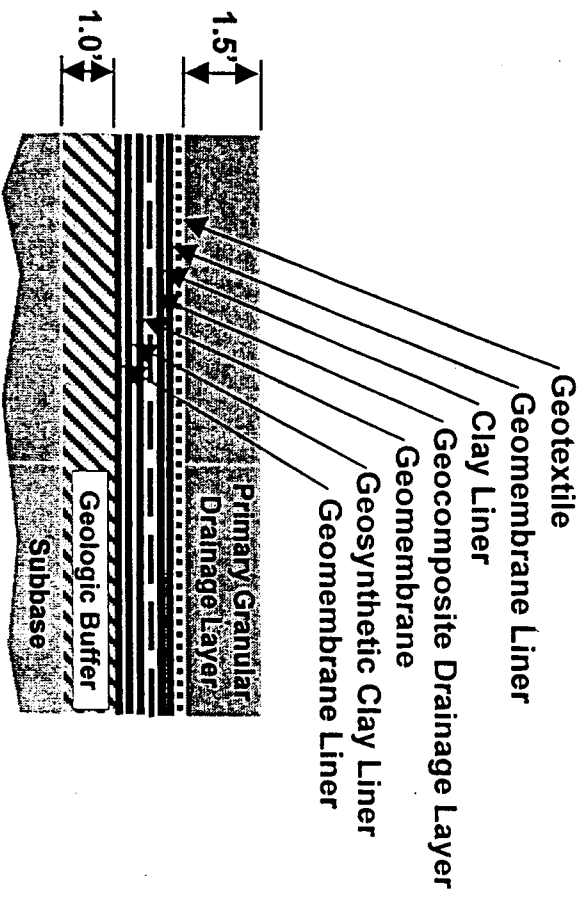
- ◆ Project involves development of leachate recirculation system at Maplewood Landfill and landfill bioreactor at King George County Landfill
- ◆ Overall Goals are:
  - Evaluate the relative effectiveness of different liquid application rates for bioreactors
  - Quantify the many benefits of leachate recirculation and bioreactor technologies on an operational scale
- ◆ Requires regulatory flexibility regarding the Liquids Restriction of 40 CFR 258.28.

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# Liner System Details: Maplewood and King George County Landfills



MAPLEWOOD LANDFILL



KING GEORGE COUNTY LANDFILL

Paul F.

# **Commonwealth of Virginia Benefits**

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## **◆ Pollution Prevention**

- Air - no long-term gas potential
- Groundwater/surface water - no long-term leachate potential
- Avoid other leachate disposal issues

## **◆ No Future “Open Dump” Status**

## **◆ Waste Stabilization**

- Prior to closure
- Active permit control
- Financial assurance
- Reduced cost to Commonwealth



# Permitting

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## ◆ Permit Amendment

- Solid Waste Experimental Facility Permit
  - (9 VAC 20-80-480.G.)
    - for solid waste facility which proposes to utilize an innovative and experimental solid waste treatment technology or process
    - protect human health and the environment
    - permit review: local certification, design, operation, closure, variance, financial assurance, public participation
  - duration: 4 years maximum, 1 year renewable

# Permitting

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## ◆ Permit Amendment

- Variances
  - VSWMR requires a composite liner
    - \* Lower component: 2' soil ( $1 \times 10^{-7}$  cm/sec)
    - \* Upper component: 60-mil HDPE
  - Both facilities currently have variances to alternate liner
  - Need a variance to leachate collection for alternate liner
  - Need a variance to recirculating bulk liquids in an alternate liner facility

# Permitting

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## ◆ Permit Amendment

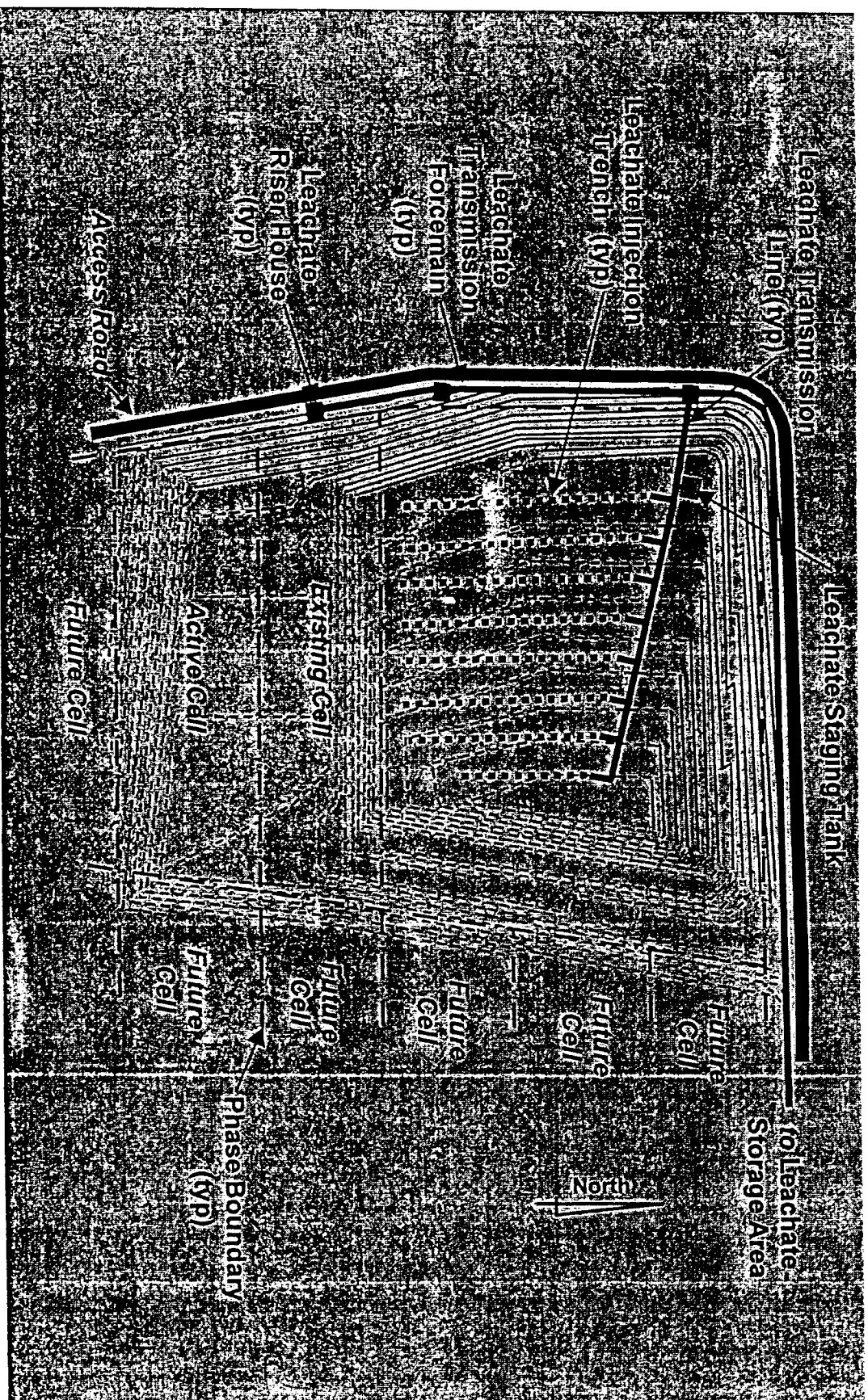
- Water Discharge Permit
- Air Permit
  - ▲ NSPS (40 CFR §60.750)

# **Design Criteria**

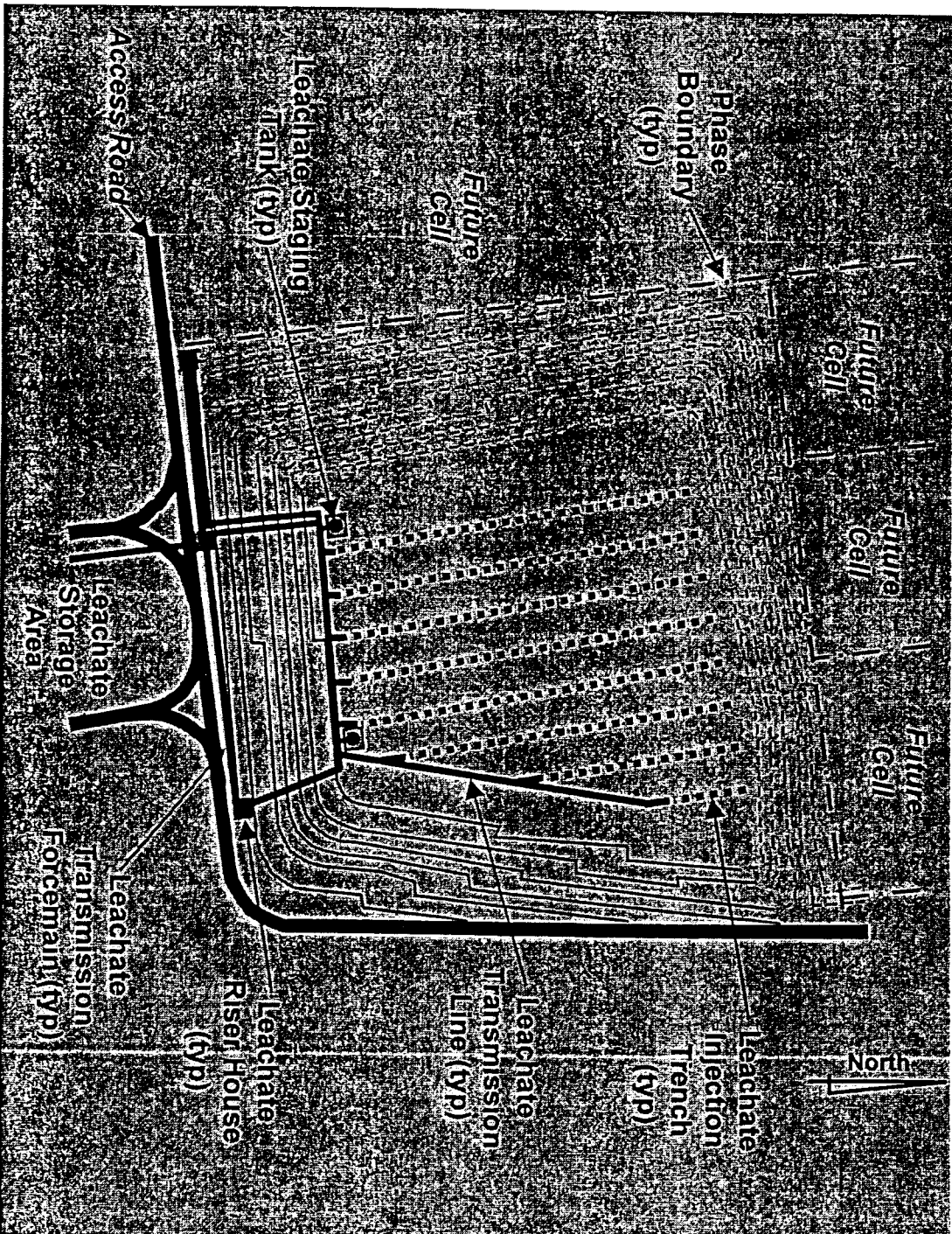
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- ◆ **Maplewood Landfill: recirculate all of the leachate generated;**
- ◆ **King George County Landfill: recirculate twice the amount recirculated at the Maplewood Landfill;**
- ◆ **Uniformly distribute leachate throughout the waste mass;**
- ◆ **Place distribution structures at least 100 feet from the crests of slopes;**
- ◆ **Provide monitoring features within the liquid application structures; and**
- ◆ **Manage landfill gas throughout the recirculation process.**

# Leachate Recirculation System Layout: Maplewood Landfill



# Landfill Bioreactor System Layout: King George County Landfill



# **Monitoring Program**

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- ◆ **Measure leachate quality in test cells and control cells;**
- ◆ **Track the total quantity of leachate collected and treated;**
- ◆ **Track the total cost for leachate treatment at off-site sources;**
- ◆ **Track the rate that leachate can be applied to the trenches;**
- ◆ **Monitor for the occurrence of odors;**
- ◆ **Monitor for landfill gas components (i.e., NMOCs, methane); and**
- ◆ **Track the settlement of the waste.**